Claims

1. Method for increasing the efficiency of a gas turbine system (1), with at least a part of the heat of the waste gases (AG) of a gas turbine (2) being transferred to a working medium featuring at least two materials with non-isothermal evaporation and condensation of a thermodynamic circulation process.

2. Method in accordance with claim 1, with a Kalina cycle being used as the thermodynamic circulation process.

3. Method according to claim 1 and/or 2, with the thermodynamic circulation process being carried out with a method featuring at least the following steps:

- Pumping a liquid flow (13) of the working medium at an increased pressure;
- Separating the pressurized liquid working medium flow (14) into a first partial flow (16) and a second partial flow (17);
- Partial evaporation of the first partial flow (16) using heat generated by cooling down of the waste gases (AG);
- Partial evaporation of the second partial flow (17) using heat generated by partial condensation of an expanded working medium flow (11);
- Combination of the partially evaporated first and second partial flow (16a or 16b) into a partially evaporated working medium flow (18);
- Creation of a gaseous working medium flow (10) by complete evaporation, if necessary partial overheating, of the partially evaporated working medium flow (18) using heat which is generated from the cooling down of the waste gases (AG),
- Expansion of the gaseous working medium flow (10),

conversion of its energy into a usable form and creation of the expanded working medium flow (11); and

- Complete condensation of the partially condensed, expanded working medium flow (12) to form the liquid working medium flow (13).

4. Method in accordance with claim 3, with the first partial flow (16) and the liquid working medium flow (13) having essentially the same temperature.

5. Method in accordance with one of the previous claims, with a further part of the heat of the waste gases (AG) of the gas turbine (2) being transferred to a water/steam circulation (4) of a steam turbine.

6. Method in accordance with one of the previous claims, with the waste gases (AG) of the gas turbine (2) upstream of the at least one heat exchanger (HE5) having a temperature of 100 to 200°C, especially 140 to 200°C.

7. Gas turbine system (1) with at least one heat exchanger (HE5) connected on the downstream side of a gas turbine (2) which is connected into a device (9) for executing a thermodynamic circulation process, with the device (9) featuring a working medium with at least two substances with non-isothermal evaporation and condensation.

8. Gas turbine system (1) in accordance with claim 7 with the thermodynamic circulation process being a Kalina cycle.

9. Gas turbine system (1) in accordance with claim 7 und/or 8, with the device (9) at least including:

- A pump (33) for pumping a liquid flow (13) of the working medium at an increased pressure;
- A separator (34) for separating the pressurized liquid

working medium flow (14) into a first partial flow (16) and a second partial flow (17);

- A first heat exchanger (HE4) for accepting the first partial flow (16) and for creating and emitting a partially evaporated first partial flow (16a) by cooling down the waste gases (AG);
- A second heat exchanger (HE2) for accepting an expanded working medium flow (11) and the second partial flow (17), for cooling down the expanded working medium flow (11) by transferring heat to the second partial flow (17) and for emitting a partially evaporated second partial flow (17a) and a partially condensed, expanded working medium flow (12);
- A mixer (35) for combining the partially evaporated first partial flow (16a) and the partially evaporated second partial flow (17a) into a partially evaporated working medium flow (18);
- A third heat exchanger (HE5) for accepting the partially evaporated working medium flow (18) and for generating and emitting a gaseous, if nec. overheated working medium flow (10) through cooling down the waste gases (AG),
- A device (32), especially a turbine, for expanding the gaseous working medium flow (10), for converting its energy into a usable form and for emitting the expanded working medium flow (11); and
- A fourth heat exchanger (condenser) (HE1) for accepting and complete condensation of the partially condensed, expanded working medium flow (12) and for emitting the liquid working medium flow (13).

10. Gas turbine system (1) in accordance with claim 9 with the first partial flow (16) and the liquid working medium flow (13) having essentially the same temperature.

11. Gas turbine system (1) in accordance with one of the claims 7 to 10, with the waste gases (AG) of the gas turbine (2) upstream of the at least one heat exchanger (HE5) having a temperature of 100 to 200°C, especially 140 to 200°C.

12. Gas turbine system 11 in accordance with one of the claims 7 to 11, with at least one further heat exchanger (5a, 5b, 5c) of a water/steam circulation (4) of a steam turbine connected between the waste gas side of the gas turbine (2) and the at least one heat exchanger (HE5).

13. Gas turbine system (1) in accordance with one of the claims 7 to 12, with the at least one heat exchanger (HE5) being arranged in an outlet air chimney (6) of the gas turbine system (1).

14. Gas turbine system (1) in accordance with one of the claims 7 to 13, with the at least one heat exchanger (HE5) being embodied as a shell and tube heat exchanger.

15. Gas turbine system (1) in accordance with one of the claims 7 to 14, where the device (9) for carrying out the thermodynamic circulation process is embodied as a standardized unit (40).

16. Gas turbine system (1) in accordance with claim 15, with the standardized unit (40) featuring a heat exchanger module (42) and a circulation module (41).

17. Gas turbine system in accordance with claim 15 and/or 16 with the circulation module (42) having a container format, especially a 20' or 40' container format.